

PATENT ABSTRACTS OF JAPAN

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(54) ON-VEHICLE INPUT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an on-vehicle input device excellent in operability and facilitating the selection of a desired on-vehicle electric apparatus and the function adjustment thereof by using a manual operation part only.

SOLUTION: A ROM 41 provided in a computer stores tables 45a, 45b, 45c, etc., expressing relations among the direction of operation of the manual operation part 3, the amount of operation thereof, and external force applied thereto by electric motors 19a, 19b. A CPU 41 determines the direction and size of external force to be loaded onto the operation part 3 base on positional information outputted from encoders 21a, 21b and on the tables 45a, 45b, 45c, etc., to drive the motors 19a, 19b by means of a motor driver 47. This enables an operator to take in a feel of resistance produced on the operation part 3 and to perform delicate operation of the operation part 3, thus facilitating the function adjustment of an on-vehicle electric apparatus. When the operation part 3 is operated to its movable limit, by loading a large external force thereon, the operator can take in the movable limit of the operation part 3, thus facilitating the selection of an on-vehicle electric apparatus.

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CLAIMS

[Claim(s)]

[Claim 1] The input unit for mount which is equipped with the following and characterized by carrying out the load of the external force beforehand set as the aforementioned operation shaft according to the control input of the aforementioned manual operation section from the aforementioned actuator when it is operated within movable limits which were able to define the aforementioned manual operation section beforehand. Manual operation section The operation shaft connected with the manual operation section concerned The position sensor which outputs the position signal according to the operation direction and control input of the aforementioned manual operation section The actuator which acts the external force of the operation direction on the aforementioned operation shaft

[Claim 2] The input unit for mount which is equipped with the following and characterized by carrying out the load of the external force beforehand set as the aforementioned operation shaft according to the operation direction and control input of the aforementioned manual operation section from the aforementioned actuator when it is operated in the direction of [other than the movable range which was able to define the aforementioned manual operation section beforehand]. Manual operation section The operation shaft connected with the manual operation section concerned The position sensor which outputs the position signal according to the operation direction and control input of the aforementioned manual operation section The actuator which acts external force on the aforementioned operation shaft

[Claim 3] The input unit for mount according to claim 1 characterized by holding the aforementioned operation shaft free [rocking] by bearing.

[Claim 4] The input unit for mount according to claim 1 characterized by for the aforementioned operation shaft fixing to a slider and sliding on a rail top.

[Claim 5] The input unit for mount according to claim 1 with which the aforementioned manual operation section is characterized by the specific thing for which it has come to be able to carry out both-way operation on the other hand only at **.

[Claim 6] The input unit for mount according to claim 1 characterized by the ability to operate it now in the directions where the aforementioned manual operation section is arbitrary in a specific field.

[Claim 7] The input unit for mount according to claim 1 to 6 characterized by the aforementioned actuator being a voice coil motor.

[Claim 8] The input unit for mount according to claim 1 characterized by carrying out the load of the vibration of the mode which carries out the load of the big external force one by one to the aforementioned operation shaft from the aforementioned actuator, or is different as the control input of the aforementioned manual operation section becomes large.

[Claim 9] The input unit for mount according to claim 1 characterized by carrying out the load of the external force more shocking than the aforementioned actuator on the aforementioned operation shaft when operated to the operation limitation that the aforementioned manual operation section was defined beforehand.

[Claim 10] The classification of the mounted electrical machinery and apparatus chosen when it connected with the display with which the automobile was equipped through the computer with which the automobile was equipped electrically and the aforementioned position sensor operated the aforementioned manual operation section. The input unit for mount according to claim 1 with which the content of the function of the mounted electrical machinery and apparatus concerned adjusted by operating the aforementioned manual operation section and activity of the aforementioned manual operation section are characterized by what is displayed on the aforementioned display.

[Claim 11] The input unit for mount according to claim 10 characterized by the aforementioned mounted electrical machinery and apparatus being a sheet adjusting device for controlling the posture of a driver's seat or a passenger seat.

[Claim 12] The input unit for mount according to claim 10 characterized by being the tilt equipment and TERESUKO equipment with which the steering system for the aforementioned mounted electrical machinery and apparatus adjusting the height of a handle was equipped.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the input unit for mount which operates the mounted various electronic equipment intensively in the one manual operation section, and relates to a means to improve the operability of the input unit concerned especially.

[0002]

[Description of the Prior Art] Although the automobile in recent years is equipped with various kinds of electronic equipment, such as an air-conditioner, radio, television, a CD player, and a navigation system, when it is going to operate such much electronic equipment individually with the operation object with which each was equipped, there is a possibility of causing trouble to an automobilism. Then, in order to enable it to perform easily an on-off change, a selection of function, etc. of desired electronic equipment, without barring a safety operation, the input unit for mount whose various operations of various kinds of electronic equipment are conventionally attained by operating the one manual operation section is proposed.

[0003] The conventional technology of this input unit for mount is explained referring to drawing 28 - drawing 31. However, the inside view of the automobile which drawing 28 shows the example of installation of the input unit for mount, the side elevation of the input unit for mount with which the conventional proposal of drawing 29 is made, the plan of the manual operation section of the input unit for mount which shows drawing 30 to drawing 29, and drawing 31 are the plans of the guide plate included in the input unit for mount shown in drawing 29.

[0004] As shown in drawing 28, the input unit 100 for mount of this example is installed in the console box 200 prepared between the automobilism seat and the passenger seat. And the conventional input unit 100 for mount shown in drawing 29 The manual operation section 110 (refer to drawing 30) equipped with two switches 111, 112 for a click, and three rotated type variable resistors 113, 114, 115 as a signal input means, X-Y table 120 driven to the 2-way (the direction which intersects perpendicularly with the space of drawing 29, and longitudinal direction of illustration) which intersects perpendicularly mutually by this manual operation section 110, The stick controller 130 as a position signal input means which inputs the signal according to the direction of operation and the amount of operation of this X-Y table 120 into an external instrument, It is mainly constituted by the engagement pin 160 which protruded on the inferior surface of tongue of X-Y table 120, and the guide plate 140 (refer to drawing 31) which has an engagement relation.

[0005] The manual operation section 110 and X-Y table 120 are unified through the connecting shaft 150, and X-Y table 120 and the guide plate 140 are being engaged by inserting the point of the engagement pin 160 in the guide slot 141 of a guide plate 140 possible [movement]. Although this guide slot 141 can be set as the arbitrary configurations which are moved in the specific direction and deal in the point of the engagement pin 160, as shown, for example in drawing 31, a flat-surface configuration can engrave the guide slot 141 on the cross on the upper surface of a guide plate 140, and the point of the engagement pin 160 can be moved to each edge of B, C, D, and E along with the 2-way which carries out an abbreviation rectangular cross from Center A. That is, by operating the manual operation section 110, the engagement pin 160 can be moved along the guide slot 141 of a guide plate 140 through X-Y table 120, and the information (position signal) about the engagement position is outputted from the stick controller 130 in the state where the point of this engagement pin 160 was located in the every place points A, B, C, D, and E in the guide slot 141. So, the function (function which it is going to adjust) set as the operation

object of the electronic equipment currently mounted can be alternatively chosen using this position signal. And if a desired function of electronic equipment is chosen in this way, the selected adjustment and selected change of a function can be performed by operating suitably three rotated type variable resistors 113-115 formed in the manual operation section 110.

[0006] Thus, the input unit 100 for mount constituted The switching equipment 170 which chooses desired electronic equipment alternatively out of two or more electronic equipment currently mounted as shown in drawing 28, The display 180 which displays the contents operated with the name and the input unit 100 for mount of electronic equipment which were chosen with this switching equipment 170, It is combined with the computer which controls each of these equipments and which is not illustrated, and two or more electronic equipment can be intensively operated now. In addition, switching equipment 170 is installed in the console box 200, and the operation switches 171a-171e are arranged near the input unit 100 for mount, and are connected with the electronic equipment by which these operation switches 171a-171e differ, respectively according to the individual. For example, supposing each operation switches 171a-171e are connected according to the mounted air-conditioner, radio, television, the CD player, the navigation system, and the individual, respectively Air-conditioner mode to the on-off change of an air-conditioner or the input unit 100 for mount can be specified by operating operation switch 171a. Radio mode to the on-off change of radio or the input unit 100 for mount can be specified by operating operation switch 171b. Similarly, mode specification to the on-off change of electronic equipment and the input unit 100 for mount which correspond, respectively can be performed by operating other operation keys 171c-171e. Moreover, the display 180, such as a liquid crystal display, is installed in the legible place from the driver's seat, and the aforementioned computer is installed in the console box 200.

[0007] Although the selection of function and functional adjustment of electronic equipment which were chosen with switching equipment 170 can be performed by operating the input unit 100 for mount, according to the kind of selected electronic equipment, a selectable function differs from the function which can be adjusted by operation of the input unit 100 for mount. For example, when switching equipment 170 is operated and it is specified as air-conditioner mode, Although the function of "air-capacity adjustment" will be chosen if the manual operation section 110 is operated, the engagement pin 160 is located in the edge B of the guide slot 141 of a guide plate 140 and the switch 111 for a click is pushed in and clicked If the engagement pin 160 is located in the edge C of the guide slot 141 and the switch 111 for a click is clicked, the function of "adjustment of a blowdown position [a style]" will be chosen. If similarly the engagement pin 160 is located in the edges D and E of the guide slot 141 and the switch 111 for a click is clicked, the function of "adjustment of the direction [a style] of the blowdown" and a "temperature control" will be chosen, respectively.

[0008] And after choosing these functions, the function can be adjusted by operating suitably the rotated type variable resistors 113-115. For example, the air capacity of an air-conditioner can be adjusted by operating the rotated type variable resistor 113, when air-conditioner mode is specified with switching equipment 170 and "air-capacity adjustment" is chosen by the manual operation section 110, and when "adjustment of a blowdown position [a style]" is similarly chosen in air-conditioner mode, the blowdown position of the wind of an air-conditioner can be adjusted by operating the rotated type variable resistor 114, 115. Moreover, when volume of radio can be adjusted by operating the rotated type variable resistor 113 when radio mode is specified with switching equipment 170 and "volume control" is chosen by the manual operation section 110 and "tuning" is similarly chosen in radio mode, radio can be tuned up by operating the rotated type variable resistor 114, 115.

[0009]

[Problem(s) to be Solved by the Invention] Since the input unit 100 for mount concerning the conventional example has regulated the operation direction and operating range of the manual operation section 110 by inserting in the guide slot 141 of a guide plate 140 the point of the engagement pin 160 united with the manual operation section 110 through the connecting shaft 150 and X-Y table 120, when the point of the engagement pin 160 runs against the trailer of the guide slot 141, it can know the operation limitation of the manual operation section 110.

[0010] However, when the load of the excessive operating physical force is carried out to the manual operation section 110 depending on this composition, there is a possibility of damaging the engagement pin 160 or the guide slot 141, and the operation of adjusting suitably the adjustment speed of the function of the mounted selected electrical machinery and apparatus according to the control input of the manual operation section 110 cannot be taken, either. Namely, the input unit 100 for mount concerning the conventional example Have the composition that the rotated type variable resistors 113-115 with which the manual operation section 110 was equipped perform functional adjustment of the mounted selected electrical machinery and apparatus, and cannot perform functional adjustment of a mounted electrical machinery and apparatus depending on the manual operation section 110, but as a matter of course The operation of adjusting suitably the adjustment speed of the function of the mounted selected electrical machinery and apparatus according to the control input of the manual operation section 110 cannot be taken. For this reason, the manual operation section 110 and the rotated type variable resistors 113-115 must be used properly by turns, and the case where functional adjustment of the mounted selected electrical machinery and apparatus cannot be performed quickly may be produced.

[0011] the mount excellent in the operability to which the place which this invention is made in order to cancel the defect of this conventional technology, and is made into the technical problem can carry out selection and its functional adjustment of a request of a mounted electrical machinery and apparatus easily using the manual operation section -- business -- it is in offering an input unit

[0012]

[Means for Solving the Problem] The operation shaft with which this invention was connected with the 1st at the manual operation section and the manual operation section concerned in order to solve the aforementioned technical problem, When it is operated

within movable limits which were equipped with the position sensor which outputs the position signal according to the operation direction and control input of the aforementioned manual operation section, and the actuator which acts the external force of the operation direction on the aforementioned operation shaft, and were able to define the aforementioned manual operation section beforehand, External force beforehand set as the aforementioned operation shaft according to the control input of the aforementioned manual operation section was made the composition of carrying out a load from the aforementioned actuator.

[0013] Since an operator can know the control input of the manual operation section sensuously by sensing the external force by which a load is carried out from an actuator according to this composition By attaining delicate operation of the manual operation section, only operating the manual operation section from an initial valve position to a movable limitation, and adjusting the control input of not only the usage of choosing a desired mounted electrical machinery and apparatus but the manual operation section It comes to be able to do usage of performing functional adjustment of the mounted selected electrical machinery and apparatus, and the operability of the manual operation section, as a result the input unit for mount can be raised. Moreover, since it is the composition which carries out the load of the external force of the predetermined intensity from an actuator to an operation shaft, an operation shaft or bearing is not damaged.

[0014] The operation shaft with which this invention was connected with the 2nd at the manual operation section and the manual operation section concerned, When it is operated in the direction of [other than the movable range which was equipped with the position sensor which outputs the position signal according to the operation direction and control input of the aforementioned manual operation section, and the actuator which acts external force on the aforementioned operation shaft, and was able to define the aforementioned manual operation section beforehand], External force beforehand set as the aforementioned operation shaft according to the operation direction and control input of the aforementioned manual operation section was made the composition of carrying out a load from the aforementioned actuator.

[0015] Since it becomes possible for an operator to be able to know the correction of the operation direction of the manual operation section sensuously by sensing this, and to operate the manual operation section only within movable limits, since the load of the external force from an actuator is carried out to an operation shaft when the manual operation section is operated in the direction of [other than the movable range which was able to be defined beforehand] according to this composition, the operability of the manual operation section is improved.

[0016] this invention made [3rd] the operation shaft in the technical-problem solution means of the above 1st the composition of holding free [rocking] to bearing. According to this composition, since the composition of an operation shaft attaching part can be simplified, it can carry out cheaply.

[0017] this invention was made the composition of 4th having fixed the aforementioned operation shaft in the technical-problem solution means of the above 1st to a slider, and sliding a rail top. According to this composition, since an operation shaft can be operated within a fixed flat surface along with a rail, operability of an operation shaft can be made good.

[0018] this invention made [5th] the aforementioned manual operation section in the technical-problem solution means of the above 1st the specific composition that it could be made to carry out only at ** both-way operation on the other hand. According to this composition, since the manual operation section can be performed for selection of a desired mounted electrical machinery and apparatus, the selected functional adjustment of a mounted electrical machinery and apparatus, etc. only to ** by [specific] carrying out both-way operation on the other hand, operability of the manual operation section can be made good.

[0019] this invention made [6th] the aforementioned manual operation section in the technical-problem solution means of the above 1st the composition of enabling it to operate it in the arbitrary directions in a specific field in order to solve the aforementioned technical problem. Since it enabled it to operate the manual operation section in the arbitrary directions in a specific field, while being able to increase the number of the mounted electrical machinery and apparatus in which selection adjustment is possible according to this composition, the kind of function which can be adjusted can also be increased.

[0020] this invention was made [7th] the composition of using a voice coil motor, as an actuator in the above 1st or the 6th technical-problem solution means. Since the voice coil motor was used as an actuator which acts external force on the manual operation section according to this composition, the mechanism for changing rotation of a motor into a both-way rectilinear motion becomes unnecessary, and a miniaturization and low-cost-izing of the input unit for mount can be attained.

[0021] this invention was made at the octavus the composition of carrying out the load of the vibration of the mode which carries out the load of the big external force one by one to the aforementioned operation shaft from the aforementioned actuator, or is different as the control input of the aforementioned manual operation section became large in the technical-problem solution means of the above 1st. According to this composition, since the control input of the manual operation section can be realized by blind touch, operability of the input unit for mount can be made better.

[0022] this invention was made composition called a load in the external force more shocking than the aforementioned actuator on the aforementioned operation shaft when operated to the operation limitation that 9th the aforementioned manual operation section was beforehand defined in the technical-problem solution means of the above 1st. Since it can realize by blind touch that the control input of the manual operation section reached to the critical point according to this composition, operability of the input unit for mount can be made better.

[0023] this invention the aforementioned position sensor in the technical-problem solution means of the above 1st [10th] The classification of the mounted electrical machinery and apparatus chosen by connecting with the display with which the automobile was equipped through the computer with which the automobile was equipped electrically, and operating the aforementioned manual operation section, The content of the function of the mounted electrical machinery and apparatus concerned

adjusted by operating the aforementioned manual operation section and activity of the aforementioned manual operation section were made the composition of displaying on the aforementioned display. According to this composition, since a passenger can perform functional adjustment of a mounted electrical machinery and apparatus, checking the content of a display of display, he can ensure [quickly and] the functional adjustment concerned.

[0024] this invention was made [11th] the composition of operating the sheet adjusting device for controlling the posture of a driver's seat or a passenger seat in the manual operation section, as a mounted electrical machinery and apparatus in the technical-problem solution means of the above 10th. According to this composition, since necessary operation can be performed by the hand using the manual operation section, -izing of the posture adjustment of a driver's seat sheet or a passenger seat sheet can be carried out [easy].

[0025] this invention was made the composition of operating the tilt equipment and TERESUKO equipment with which the steering system for adjusting the height of a handle was equipped in the manual operation section, as a mounted electrical machinery and apparatus in the technical-problem solution means of the 12th above 10th. According to this composition, since necessary operation can be performed by the hand using the manual operation section, -izing of the height adjustment of a handle can be carried out [easy].

[0026]

[Embodiments of the Invention] Hereafter, the example of the 1st operation gestalt of the input unit for mount concerning this invention is explained, referring to a drawing.

[0027] The perspective diagram showing the installation state to the dashboard of the input unit for mount which drawing 1 requires for the example of the 1st operation gestalt, and drawing 2 are the plans showing the indoor state of an automobile where the input unit for mount concerning the example of the 1st operation gestalt was attached. The input unit 1 for mount concerning this example of an operation gestalt so that clearly from drawing 1 The case 2 is formed in the shape of [of a necessary size] a square shape container. in the upper surface of the case 2 concerned Six push button switches 4a, 4b, 4c, 4d, 4e, and 4f consisting mainly of the manual scanning section 3 and the setting section of the manual scanning section 3 concerned arranged circularly. This, three push button switches 5a, 5b, and 5c arranged in the shape of a concentric circle, and volume tongues 6 are arranged by the periphery portion of the array position of the six push button switch groups concerned. Moreover, in the front face of the case 2 concerned, the card slot 7 and the disk slot 8 are established. As shown in drawing 2, this input unit for mount is attached between the driver's seat B of the dashboard A of an automobile, and a passenger seat C, has two incomes with the computer which was contained in the display D with which Dashboard A was equipped, and Dashboard A and which is not illustrated, and can demonstrate a necessary function now.

[0028] A total of nine above-mentioned push button switches 4a, 4b, 4c, 4d, 4e, and 4f, and 5a, 5b and 5c are individually connected with the mounted electrical machinery and apparatus which it is going to operate using the input unit 1 for mount, for example, an air-conditioner, radio, television, a CD player, a car-navigation system, etc. Although it can be set up arbitrarily which push button switch and which mounted electrical machinery and apparatus are connected in the input unit 1 for mount, of this example push button switch 4a Menu selection, Air-conditioner and push button switch 4d A car-navigation system, [push button switch 4b] [telephone and push button switch 4c] Radio and push button switch 4f The reader writer or disk drive equipment of a card, [push button switch 4e] The on-off control of the liquid crystal shutter with which the attitude control of the input unit 1 for mount and push button switch 5b were prepared for push button switch 5a all over Display D, Push button switch 5c is connected to television, respectively, and the mounted electrical machinery and apparatus connected to the push button switch concerned can be chosen now by pushing in the knob of a desired push button switch. In order to prevent an operation mistake, a character, a pictorial symbol, etc. which show each mounted electrical machinery and apparatus to which each switch was connected are displayed on the front face of the knob of each push button switch (illustration abbreviation).

[0029] The perspective diagram of the mechanism section 11 equipped with the manual scanning section 3 and the manual scanning section 3 concerned, as for drawing 3; the important section cross section which looked at drawing 4 from [where it has the manual scanning section 3 and the manual scanning section 3 concerned / of the mechanism section 11] the side, the important section cross section which looked at drawing 5 from [of the mechanism section 11] the flat surface, and drawing 6 are the plans of the manual scanning section 3 which removed covering.

[0030] So that clearly from drawing 3 or drawing 5 the mechanism section 11 The base 12 attached in the base of a case 2, and the spherical bearing 13 prepared in the base 12, The operation shaft 14 with which spherical section 14a prepared in mist or lower part approach from the center section was supported to revolve by spherical bearing 13 free [rocking], the clamp of the operation shaft 14 attached in the upper-limit section of driving shaft 15a of the solenoid 15 arranged under the spherical bearing 13, and a solenoid 15 -- with a member 16 The two axes of rotation 17a and 17b arranged on the axis which intersects perpendicularly in a field parallel to the base 12 focusing on spherical bearing 13, Two main wheels 18a and 18b which fixed to the point of each axes of rotation 17a and 17b, Two electric motors 19a and 19b arranged in parallel with each aforementioned axes of rotation 17a and 17b, Two pinions 20a and 20b which fix on the main shaft of the electric motors 19a and 19b concerned, and are meshed with the aforementioned main wheels 18a and 18b, Two encoders 21a and 21b which detect the hand of cut and rotation of a main shaft of the aforementioned electric motors 19a and 19b, rocking of the direction of X of the aforementioned operation shaft 14 and the direction (refer to drawing 5) of Y is changed into rotation of the direction of X, and the direction of Y, and it transmits to the aforementioned axes of rotation 17a and 17b -- L characters consists of members 22a and 22b, and the manual scanning section 3 is attached in the upper-limit section of the aforementioned

operation shaft 14

[0031] the clamp which the soffit section of the operation shaft 14 is formed in the cone which becomes so thin that it results below, and counters with this -- impression 16a of approximate circle drill type which can insert the point of the operation shaft 14 is formed in the upper surface of a member 16 therefore, the solenoid 15 -- ON operation -- carrying out -- a clamp -- if a member 16 is gone up, the point of the operation shaft 14 will be inserted into impression 16a, the operation shaft 14 will be clamped, and rocking centering on spherical section 14a will be forbidden on the other hand, the solenoid 15 -- turning off -- a clamp -- if a member 16 is descended -- the operation shaft 14 and a clamp -- engagement to a member 16 is canceled and the operation shaft 14 becomes a rockable focusing on spherical section 14a In addition, about the on-off operation of a solenoid 15, it mentions later.

[0032] As main wheels 18a and 18b and pinions 20a and 20b, the usual gearing corresponding to specification is applicable, and also in order to lose backlash, especially the thing for which that by which the device was made is used is desirable. Since backlash is lost, as a device, elastic bodies, such as rubber, can be arranged into the addendum portions of main wheels 18a and 18b and/or Pinions 20a and 20b, and it can mention engaging main wheels 18a and 18b and Pinions 20a and 20b through the elastic body concerned.

[0033] To one side of Members 22a and 22b, it ****s L characters, a hole 23 is established, and the long hole-like operation shaft breakthrough 24 is established the other sides. As shown in drawing 4, Members 22a and 22b are in this state that penetrated the operation shaft 14 to the operation shaft breakthrough 24, and are concluded on the screw 25 which one side ****ed and was inserted in the hole 23 by the side of main wheels 18a and 18b of L characters. In order that the breadth of the operation shaft breakthrough 24 may make small the backlash produced between the operation shafts 14, it is the range which can secure smooth sliding of the operation shaft 14, and is formed in the value near the diameter of the operation shaft 14 if possible. Moreover, the length of the operation shaft breakthrough 24 is the same as the movable range of the operation shaft 14, or is set as a bigger value than it. Therefore, if the manual operation section 3 is grasped and the operation shaft 14 is rocked from a center position The members 22a and 22b of L characters circle with the rotation according to the direction component of X, and the direction component of Y. The rotation is transmitted to each encoders 21a and 21b through main wheels 18a and 18b and Pinions 20a and 20b, and the hand of cut and rotation of the operation shaft 14 are detected by the computer set up in Dashboard A.

[0034] As are shown in drawing 3 and drawing 4, and it is formed in the center section of the top face in the shape of [which has the transparent aperture 31] a dome and is shown in the interior at drawing 4 and drawing 6, the manual operation section 3. It consists of a photo interrupter 33 which consists of combination of the circuit board 32, and the light emitting device and photo detector which were mounted in the aforementioned transparent aperture 31 of the circuit board 32 concerned, and the portion which counters, and the 1st and 2nd switches 34 and 35 mounted in the periphery of the aforementioned circuit board 32.

[0035] the time of the light of the specific wavelength concerned carrying out incidence to the photo detector which does not emit and illustrate the light of specific wavelength, for example, infrared radiation, from the light emitting device which a photo interrupter 33 is for carrying out on-off control of the aforementioned solenoid 15; and is not illustrated -- the aforementioned solenoid 15 -- ON control -- carrying out -- the aforementioned clamp -- a member 16 -- descending -- the clamp concerned -- engagement on a member 16 and the aforementioned operation shaft 14 cancels, and rocking operation of an operation shaft 14 makes possible In addition, the signal transmission from the current supply and the photo interrupter 33 concerned to the photo interrupter 33 concerned is performed by the code 28 inserted in the operation shaft 14.

[0036] On the other hand, as the above 1st and 2nd switch 34 and 35, it has each function of a rotation detection operation switch and a pushing detection operation switch, and that by which the knob is arranged in the center position is used at the time of un-operating the switch concerned. As this kind of a switch, an applicant for this patent can do patent application first, and can mention what was indicated by JP,9-274830,A. As shown in drawing 6 from a center position, it is set as the peripheral face of the manual scanning section 3 by the bilateral symmetry, and rotation operation can be carried out in the direction of an arrow (b) or a (b) along with the peripheral face of the manual scanning section 3, and also it pushes in in the direction of an arrow (c), and the 1st which operates these [1st] and the 2nd switch 34 and 35, and 2nd knobs 34a and 35a can be operated.

[0037] Moreover, these [1st] and the 2nd switch 34 and 35 are set up so that each operation direction of the 1st and 2nd knobs 34a and 35a and the function switched by this may become the same. Namely, although these [1st] and the 2nd switch 34 and 35 are used as a switch which switches the function of the mounted electrical machinery and apparatus chosen by operating the push button switches 4a, 4b, 4c, 4d, 4e, and 4f set as the upper surface of a case 2 The same function of the mounted selected electrical machinery and apparatus is switched by operating the 1st switch 34 and the 2nd switch 35 in the same direction. When push button switch 4c is operated and an air-conditioner is chosen, for example, the 1st switch 34 and the 2nd switch 35 The setting temperature of an air-conditioner is gone up by operating the 1st and 2nd knobs 34a and 35a in the direction of an arrow (b). By operating the 1st and 2nd knobs 34a and 35a in the direction which is an arrow (b), the setting temperature of an air-conditioner is descended and on-off control of the air-conditioner is carried out by operating the 1st and 2nd knobs 34a and 35a in the direction of an arrow (c).
 [0038] Thus, if each operation direction of the 1st and 2nd knobs 34a and 35a and the function switched by this are identified When a car with right-hand steering is equipped with the mounted input unit concerning this example of an operation gestalt Moreover, since the same functional change can be performed by operating the knob which sees from an operator and becomes the same physical relationship in the same direction when a left-hand-drive

car is equipped. An operator cannot commit a failure easily, the input unit for mount of the same composition can be applied also as an object for left-hand-drive cars also as an object for cars with right-hand steering, and the versatility of a mounted input unit is raised. Moreover, since the switch with which the manual operation section 3 concerned was equipped also from the passenger seat also from the driver's seat by using 1st knob 34a and 2nd knob 35a properly can be operated with the same feeling, it is hard to commit a failure and the operability of a mounted input unit can be raised.

[0039] Electric motors 19a and 19b are for giving a feeling of resistance to operation of the manual operation section 3, for example, are applied to the regulation of operating speed according to regulation of the operation direction of the manual operation section 3, and the control input of the manual operation section 3, arrest-point regulation of the manual operation section 3, etc.

[0040] That is, since the manual operation section 3 performs selection of the mounted electrical machinery and apparatus which it is going to control by rocking in the specific direction, and selected functional adjustment of a mounted electrical machinery and apparatus, unless it can operate it correctly in the direction appointed beforehand, it cannot perform correctly selection or functional adjustment of a mounted electrical machinery and apparatus. Then, although operation of the manual operation section 3 to the direction appointed beforehand can be performed by the small operating physical force, for operation of the manual operation section 3 to the other direction, electric motors 19a and 19b are driven, the load of the torque of the operation direction and opposite direction is carried out to the operation shaft 14, and a feeling of resistance is given to operation of the manual operation section 3. By this, since an operator can know sensuously having operated the manual operation section 3 in the direction which is not planned, he can prevent beforehand the false drop of a mounted electrical machinery and apparatus, and the error of functional adjustment.

[0041] Moreover, when the manual operation section 3 tends to be operated and it is going to perform functional adjustment of a mounted electrical machinery and apparatus (for example, when it is going to change the setting temperature of an air-conditioner), although the change of setting temperature is gently performed when the control input of the manual operation section 3 is small, if the control input of the manual operation section 3 is enlarged, the change of setting temperature will be performed at high speed. For this reason, if there is no feeling of resistance in operation of the manual operation section 3 in any way, since the control input of the manual operation section 3 will tend to become large, it becomes difficult to perform the minor change of setting temperature correctly and quickly, and operability will become bad. Then, when the control input of the manual operation section 3 becomes to some extent large, electric motors 19a and 19b are driven, the load of the torque of the operation direction and opposite direction is carried out to the operation shaft 14, and a feeling of resistance is given to operation of the manual operation section 3. Since it can know sensuously that an operator's control input of the manual operation section 3 will be too large, and setting temperature of an air-conditioner cannot be finely tuned by this, setting temperature of an air-conditioner can be finely tuned correctly and quickly by making small the control input of the manual operation section 3. In addition, it can replace with the composition which gives a feeling of resistance to operation of the manual operation section 3 in the stage to which the control input of the manual operation section 3 became to some extent large, and it can also constitute so that a different feeling of resistance may be given to the manual operation section 3 one by one according to the control input of the manual operation section 3. Moreover, although the above-mentioned explanation explained taking the case of the case which increases the control input of the manual operation section 3 where it is alike, therefore adjustment speed, such as setting temperature of an air-conditioner, increases, for example, when [which the operating speed of the manual operation section 3 increases] it is alike, therefore adjustment speed increases, a feeling of resistance can also be given to the manual operation section 3 by the same method.

[0042] Furthermore, if a mechanical method, for example, the method of making the edge of spherical bearing 13 attach the operation shaft 14, is taken as a means to regulate the operation limitation of the manual operation section 3. Since big mechanical power acts on the attachment section of these spherical bearing 13 and the operation shaft 14 and wear arises whenever it operates the manual operation section 3, wear powder enters between spherical section 14a of spherical bearing 13 and the operation shaft 14. It is easy to produce un-arranging [that the operating physical force of the operation shaft 14 becomes large, or rocking of the operation shaft 14 becomes impossible in being the worst.]. Then, when the manual operation section 3 is operated to the position defined beforehand, electric motors 19a and 19b are driven, and the load of the shocking torque is carried out to the operation shaft 14 at the operation direction and opposite direction, for example. If it does in this way, since an operator can know sensuously having operated the manual operation section 3 to the operation limitation, while being able to suspend operation of the manual operation section 3 beyond it, attachment with the edge of spherical bearing 13 and the operation shaft 14 is prevented, and generating of wear powder is reduced and it can prevent beforehand above un-arranging resulting from generating of wear powder. Moreover, by the torque of electric motors 19a and 19b, the manual operation section 3 can be automatically returned to a center position, and operability of the manual operation section 3 can be made good.

[0043] In addition, it is possible it not only to give a feeling of resistance to the manual operation section 3, but to apply external force to the sense to which the manual operation section 3 is moved. For example, when moving the manual operation section 3 in the direction downed in volume on the contrary so that a feeling of resistance may be sensed, when adjusting the volume of the radio mentioned later or a CD player and moving the manual operation section 3 in the direction which raises volume, the load of the external force can be carried out to the manual operation section 3 so that a feeling of acceleration may be sensed. Since volume can be promptly extracted to down volume while being able to cancel un-arranging [that the sound which comes out to the vehicle interior of a room becomes large suddenly] in case volume is raised if it does in this way,

it is cancelable un-arranging [that conversation is prevented from listening or the conversation of an audio].

[0044] Control of each [these] electric motors 19a and 19b is performed according to the instructions from the computer which it had in Dashboard A. Hereafter, the control method of the electric motors 19a and 19b performed by computer concerned is explained based on drawing 7 or drawing 11. Explanatory drawing which illustrates the classification of the mounted electrical machinery and apparatus as which drawing 7 is chosen by the operation direction of the manual operation section 3, and it, Explanatory drawing which illustrates the classification of the function in which drawing 8 is switched by the operation direction of the manual operation section 3, and it, The block diagram in which drawing 9 shows the control system of electric motors 19a and 19b, front drawing showing an example of the data table memorized by the memory by which the computer was equipped with drawing 10, and drawing 11 are flow charts which show the control procedure of electric motors 19a and 19b.

[0045] As shown in drawing 7 (a) and (b), the mounted input unit 1 of this example can choose now radio, an air-conditioner, a car-navigation system, a CD player, television, a surveillance camera, an E-mail, and a telephone, respectively by operating the manual operation section 3 in each direction of the left rear, the left, and the forward left the forward right, the right, the right rear, and the back a front [position / center]. In addition, classification of the electrical machinery and apparatus chosen by operating the classification and the manual operation section 3 concerned of the electrical machinery and apparatus chosen by the push button switches 4a, 4b, 4c, 4d, 4e, and 4f with which the mounted input unit 1 was equipped, and 5a, 5b and 5c can also be made into the combination of an electrical machinery and apparatus of the same kind, and also let it be the combination of an electrical machinery and apparatus of a different kind. In this example of an operation gestalt, classification of the electrical machinery and apparatus chosen by operating the classification and the manual operation section 3 of an electrical machinery and apparatus which are chosen by the push button switches 4a-4f, and 5a-5c is made into the combination of an electrical machinery and apparatus of a different kind.

[0046] When television is chosen by operating the manual operation section 3 backward from a center position As shown in drawing 8 (a), by operating the manual operation section 3 forward from a center position A channel rise, Each functional adjustment of a volume down is attained by operating the manual operation section 3 backward from a center position by operating a volume rise and the manual operation section 3 leftward from a center position by operating a channel down and the manual operation section 3 rightward from a center position.

[0047] ** -- when the number of the functions which should be adjusted by operating the manual operation section 3 like is below "8" that is the maximum number of the movable direction of the manual operation section 3, even if it operates the manual operation section 3 in the direction of [other than the direction (each direction shown in drawing 8 (a)) assigned as an object for functional adjustment]; functional adjustment of the mounted selected electrical machinery and apparatus cannot be performed If it has this neutral zone in the operating range of the manual operation section 3, he is not desirable from the safety operation of an automobile while he lacks in operation ease, since an operator has to operate the manual operation section 3 in the direction in which functional adjustment is possible carefully.

[0048] Then, in the input unit 1 for mount concerning this example of an operation gestalt, the aforementioned problem is solved by considering as the composition which shows the control system of electric motors 19a and 19b to drawing 9 and drawing 10, and controlling electric motors 19a and 19b by the procedure shown in drawing 11.

[0049] namely, the tables 45a, 45b, and 45c which encoded the size of the torque generated in ROM44 with which the computer concerned was equipped by the hand of cut of electric motors 19a and 19b and rotation according to the operation field and each operation field of the manual operation section 3 while forming the collating section 42 and the table selection section 43 in CPU41 with which the computer in Dashboard A was equipped, as shown in drawing 9 ... is memorized Moreover, Display D is equipped with the position signal detecting element 46 which displays operation tracing of the manual operation section 3; while downloading the signal from Encoders 21a and 21b to the aforementioned computer and outputting the table selection signal according to the operation field of the manual operation section 3 to the aforementioned table selection section 43.

[0050] Drawing 10 is drawing showing an example of the table memorized by ROM44, and a drive and halt, and hand of cut of electric motors 19a and 19b when the manual operation section is operated in each field which divided equally eight in eight division into equal parts and the direction of Y, and was equally divided in the direction of X encode the movable range of the manual operation section 3, and it is displayed. As for the sign and number which were indicated in each table, a drive and halt and hand of cut of 1st electric-motor 19a, and the lower berth show [the upper case] a drive and halt, and hand of cut of 2nd electric-motor 19b, the sign "+" shows normal rotation of a motor and the sign "-" shows the inversion of a motor. Moreover, it means that electric motors 19a and 19b do not rotate a number "0", and means that electric motors 19a and 19b rotate a number "1." If this table is followed, the field of - (X3, Y0) (X3, Y7), (X4, Y0) When the manual operation section 3 is operated in the field of - (X4, Y7) - (X0, Y3) (X7, Y3) a field, and (X0, Y4) the field of - (X7, Y4) The feeling of resistance accompanying rotation of electric motors 19a and 19b is not given to the movement of the manual operation section 3, without neither of the electric motors, 19a nor 19b, rotating. When the manual operation section 3 is operated in the field of others other than this, one of the electric motors 19a and 19b rotates at least, and the feeling of resistance accompanying rotation of electric motors 19a and 19b is given to the movement of the manual operation section 3.

[0051] Therefore, as television is chosen first and by operating the manual operation section 3 shows to drawing 8 (a) [when the manual operation section 3 is operated front, the back, the right, and leftward from a center position and functional adjustment of television is attained] If the roll control of electric motors 19a and 19b is performed using the table of drawing 10 If the manual operation section 3 is operated from a center position in the directions of slant other than front,

the back, the right, and the left Since one of the electric motors 19a and 19b rotates at least and the feeling of resistance accompanying rotation of electric motors 19a and 19b is given to the movement of the manual operation section 3, an operator can know sensuously operating the manual operation section 3 to the neutral zone. Therefore, since it becomes possible to operate the manual operation section 3 in the direction which can perform desired functional adjustment, an operator's operation ease of the manual operation section 3 improves, and he does not check an automobilism.

[0052] The roll control of the electric motors 19a and 19b in a computer is performed by the procedure shown in the flow chart of drawing 11.

[0053] That is, if an operator operates the manual operation section 3 in the direction of either from a center position (Procedure S1), through Members 22a and 22b, main wheels 18a and 18b, and Pinions 20a and 20b, Encoders 21a and 21b will rotate only the rotation proportional to the amount of rocking of the manual operation section 3 in the rocking direction of the manual operation section 3, and will output the position signal of L characters to it. the position signal detecting element 46 with which the computer was equipped -- this position signal -- reading (Procedure S2) -- the actuated valve position of the manual operation section 3 -- deciding (Procedure S3) -- transmission of the table selection signal to the table selection section 43 and transmission of the position signal to Display D are performed (procedure S4). The table selection section 43 of CPU41 chooses and incorporates a predetermined table from ROM44 based on the table selection signal from the position signal detecting element 46 (Procedure S5). The collating section 42 of CPU41 decides a motor output value from the position signal outputted from Encoders 21a and 21b, and the table incorporated by the table selection section 43, and outputs it to the motor driver 47 (Procedure S6). The motor driver 47 drives electric motors 19a and 19b according to a motor output value, and gives a feeling of resistance to the movement of the manual operation section 3 (Procedure S7). An operator realizes the feeling of resistance of the manual operation section 3, and changes the actuated valve position of the manual operation section 3 (Procedure S8).

[0054] In addition, these motor control meanses and methods are not only applicable to regulation of the operation direction of the manual operation section 3 but applicable to grant of the feeling of resistance according to said control input of the manual operation section 3, and grant of the feeling of resistance in the operation limitation of the manual operation section 3.

[0055] The input unit 1 for mount concerning this example of an operation gestalt constituted as mentioned above is attached possible [longitudinal slide movement] and possible [an inclination] to the dashboard A of an automobile. drawing 12 was seen from [which shows the attachment mechanism of the input unit 1 for mount over Dashboard A.] the flat surface -- it is a fracture view in part and drawing 13 was seen from [the] the side -- it is a fracture view in part

[0056] On the base 51 prepared in Dashboard A, two guidance shafts 52 and 53 and one ball thread 54 are mutually attached in parallel so that clearly from these drawings. The ball thread 54 is supported by bearing 55 free [rotation], and the 1st motor 57 for order ** is connected with the end through joint 56. Moreover, the transfer board 59 is attached in the ball thread 54 concerned possible [longitudinal slide movement] through the nut 58, and the transfer board 59 concerned is attached in the aforementioned guidance shafts 52 and 53 free [sliding] through the slider 60. The axis of rotation 62 supported free [rotation] is attached in the point of the aforementioned transfer board 59 right-angled with the guidance shafts 52 and 53 and the ball thread 54 by bearing 61, and the case 2 of the input unit 1 for mount has fixed to the point of the axis of rotation 62 concerned. The main wheel 63 has fixed in the aforementioned axis of rotation 62, and this main wheel 63 is meshed with the pinion 65 which fixed on the main shaft of the 2nd motor 64.

[0057] Therefore, the input unit 1 for mount can make it circle facing up or downward in a point to Dashboard A by being able to make it move forward or retreat to Dashboard A, and rotating normally or reversing the 2nd motor 64 by rotating normally or reversing the 1st motor 57. Therefore, since the posture of the input unit 1 for mount can be suitably changed so that an operator may tend to operate the manual operation section 3, and various kinds of push button switches 4a-4f, 5a-5c besides volume tongue 6 grade, the operability of the input unit 1 for mount can be raised further.

[0058] Attitude control of this input unit 1 for mount can also be performed by operating the manual operation section 3 and the push button switches 4a-4f which were carried in the input unit 1 for mount, and 5a-5c. That is, if push button switch 4a is pushed, the menu illustrated to Display D at drawing 14 will appear. Then, if the manual operation section 3 is operated and "the input unit for mount" is chosen from a menu, the picture of the input unit 1 for mount as shown in Display D at drawing 15 will appear. If the 1st motor 57 of the above will rotate normally, the input unit 1 for mount will move forward, if the manual operation section 3 is operated towards "Advance a", and the manual operation section 3 is operated towards "Retreat b" in this state, the 1st motor 57 of the above will be reversed and the input unit 1 for mount will retreat. Moreover, if the 2nd motor 64 of the above will rotate normally, the point of the input unit 1 for mount will circle upward focusing on the axis of rotation 62, if the manual operation section 3 is operated towards "Elevation c", and the manual operation section 3 is operated towards "Descent d", the 2nd motor 64 of the above will be reversed and the point of the input unit 1 for mount will circle downward focusing on the axis of rotation 62. If a "sheet" is chosen from a menu screen, the same procedure can adjust the comfortableness of a driver's seat or a passenger seat, and if a "handle" is chosen from a menu screen, the same procedure can adjust the tilt of a handle, and telescopic one, and height adjustment of a handle can be performed.

[0059] in addition, in changing postures, such as the input unit 1 for mount, and an above-mentioned sheet, besides an above-mentioned handle, by operating the manual operation section 3 The movable range of these devices and the feeling of resistance which joins the manual operation section 3 are associated mutually. For example, when the feeling of resistance which joins the manual operation section 3 is strengthened gradually or it results in the end of the movable range as the

end of the movable range of a device was approached, especially the thing for which a table is set up so that a shocking feeling of resistance may be given to the manual operation section 3 is desirable. If it does in this way, since it can recognize whether the operator adjusted the device by the movable range throat top, use becomes convenience more.

[0060] ** -- the input unit 1 for mount concerning the example of the 1st operation gestalt can choose the mounted electrical machinery and apparatus of the request which is going to perform functional adjustment like by operating the push button switches 4a-4f with which the upper surface of a case 2 was equipped, and 5a-5c, or operating the manual operation section 3. Moreover, after choosing a desired mounted electrical machinery and apparatus, functional adjustment of a mounted electrical machinery and apparatus can be performed by operating the 1st and 2nd switches 34 and 35 which operated it in the direction which was able to define the manual operation section 3 beforehand, or were formed in the manual operation section 3. Moreover, volume, such as radio, and television, besides a CD player, can be performed also by rotating the volume tongue 6. About the operation direction of the manual operation section 3, it is displayed on the menu of a selectable mounted electrical machinery and apparatus, the menu in which the content of the function in which the adjustment about each mounted electrical machinery and apparatus is possible is shown, and it by Display D one by one with this input unit 1 for mount. moreover, the state of the manual operation section 3 where it is not operated -- setting -- the operation shaft 14 -- a clamp -- it is clamped by the member 16 and the unjust vibration of the manual operation section 3 and generating of noise accompanying vibration of an automobile are prevented if a finger is held up above the manual operation section 3, the light of the specific wavelength from a light emitting device will carry out incidence to the photo detector of a photo interrupter 33, and a solenoid 15 will carry out ON control -- having -- a clamp -- engagement is canceled for a member 16 and the operation shaft 14, and the manual operation section 3 becomes operational automatically

[0061] In addition, in the aforementioned example of the 1st operation form, although gear mechanism was used as a power transmission device which transmits rocking of the operation shaft 14 to Encoders 21a and 21b, the summary of this invention is not limited to this and can also use arbitrary power transmission devices which belong well-known, such as a friction wheel and a belt mechanism.

[0062] Moreover, in the aforementioned example of the 1st operation form, although Encoders 21a and 21b were used as a sensor which detects the rocking direction and the amount of rocking of the operation shaft 14, the summary of this invention is not limited to this and can also use the arbitrary position sensors which belong well-known.

[0063] moreover, the aforementioned example of the 1st operation form -- setting -- a clamp -- although the solenoid 15 was used as driving means of a member 16, the summary of this invention is not limited to this and can also use other meanses, such as an electromagnet, and oil pressure or an air actuator

[0064] Furthermore, although it enabled it to operate the manual operation section 3 in the many directions using two electric motors 19a and 19b and two encoders 21a and 21b, it can make it possible to operate the manual operation section 3 only in the one specific direction in the aforementioned example of the 1st operation form using one electric motor and one encoder.

[0065] Hereafter, the example of the 2nd operation form of the input unit for mount concerning this invention is explained using drawing 16 or drawing 18. It is what is characterized by the input unit for mount of this example equipping mechanism section 11A with a voice coil motor as an actuator for acting external force on the operation shaft 14. The plan in which mechanism section 11A which drawing 16 requires for this example carried out the cross section the part, the direction side elevation of X in which mechanism section 11A which drawing 17 requires for this example carried out the cross section the part, and drawing 18 are the direction side elevations of Y in which mechanism section 11A concerning this example carried out the cross section the part.

[0066] So that clearly from these drawings mechanism section 11A of this example The base 12, the spherical bearing 13 prepared in the base 12 concerned, and the operation shaft 14 with which spherical section 14a was prepared in the soffit section, and the spherical section 14a concerned was supported to revolve by the aforementioned spherical bearing 13 free [rocking], two arranged in the direction with which the operation shaft 14 concerned is equipped, and which intersects perpendicularly mutually -- with Members 22a and 22b L characters Two voice coil motors 71 and 72 arranged on the axis which intersects perpendicularly in a field parallel to the base 12 focusing on the aforementioned spherical bearing 13, Two brackets 73 and 74 which fixed, respectively to the moving part 71a and 72a of the voice coil motors 71 and 72 concerned, The connection pin 75 which enables [each / these / bracket 73 and 74 and aforementioned] pin combination of the rotation of Members 22a and 22b of L characters each, It consists of two position sensors 76 and 77 which detect the movement magnitude and the move direction of each aforementioned brackets 73 and 74, and the manual scanning section 3 is attached in the upper-limit section of the aforementioned operation shaft 14.

[0067] L characters to the point of the one side and the aforementioned brackets 73 and 74 of Members 22a and 22b A hole 78 is agreed. the pin insertion for inserting the connection pin 75 -- a hole 78 establishes -- having -- **** -- L characters -- a member -- the pin insertion established by 22a -- the pin insertion established by the hole 78 and the bracket 73 -- these the pin insertion of each -- penetrating the connection pin 75 to a hole 78 -- these L characters -- a member -- it can connect possible [rotation of 22a and a bracket 73] the same -- L characters -- a member -- the pin insertion established by 22b -- the pin insertion established by the hole 78 and the bracket 74 -- a hole 78 -- agreeing -- these the pin insertion of each -- penetrating the connection pin 75 to a hole 78 -- these L characters -- a member -- 22b and a bracket 74 can be connected with a rockable

[0068] The operation shaft breakthrough 24 of the shape of a long hole for [this] penetrating the operation shaft 14 of L characters is established the other sides of Members 22a and 22b. In order that the breadth of this operation shaft breakthrough

24 may make small the backlash produced between the operation shafts 14, it is the range which can secure smooth sliding of the operation shaft 14, and is formed in the value near the diameter of the operation shaft 14 if possible. Moreover, the length of the operation shaft breakthrough 24 is the same as the movable range of the operation shaft 14, or is set as a bigger value than it.

[0069] Voice coil motors 71 and 72 consist of moving part 71a and 72a in which the aforementioned brackets 73 and 74 were attached, and fixed parts 71b and 72b which the moving part 71a and 72a concerned consisted of possible [in-and-out], and are attached in the bracket 79 with which the back end section of fixed parts 71b and 72b was prepared in the base 12 possible [revolution] through the universal joint 80. therefore, the thing for which a voice coil motor 71 is driven regardless of to which position the operation shaft 14 was operated -- a bracket 73 and L characters -- a member -- being able to carry out the load of the external force of the direction of X to the operation shaft 14 through 22a, and driving a voice coil motor 72 -- a bracket 74 and L characters -- a member -- the load of the external force of the direction of Y can be carried out to the operation shaft 14 through 22b Of course, the load of the external force of the direction according to the output of each voice coil motors 71 and 72 and a size can be carried out to the operation shaft 14 by driving voice coil motors 71 and 72 simultaneously. Thereby, a feeling of resistance and a feeling of acceleration can be given to operation of the manual operation section 3, for example, adjustment of operating speed according to regulation of the operation direction of the manual operation section 3 and the control input of the manual operation section 3, arrest-point regulation of the manual operation section 3, etc. can be performed.

[0070] Position sensors 76 and 77 consist of needles 76b and 77b by which insertion arrangement was carried out in the main parts 76a and 77a of a detector, the main part of detector 76a concerned, and 77a, and, as for Needles 76b and 77b, the end is attached in the aforementioned brackets 73 and 74. As these position sensors 76 and 77, a photo interrupter, volume, etc. can use the sensor of the optical type which belongs well-known, a magnetic formula, and a resistance formula, for example, and the signal which is proportional to the rocking direction and the amount of rocking of the aforementioned operation shaft 14 from a center valve position is outputted.

[0071] As shown in drawing 17 and drawing 18, the manual operation section 3 is formed in the knob form, and can also equip the interior with the circuit board 32, a photo interrupter 33, the 1st, and 2nd switches 34 and 35 (refer to drawing 4). like the manual operation section 3 concerning the example of the 1st operation form.

[0072] About other composition, since it is the same as the input unit for mount concerning the example of the 1st operation form, in order to avoid duplication, explanation is omitted.

[0073] since the input unit for mount concerning this example of an operation form had the effect of the input unit for mount concerning the example of the 1st operation form, and this appearance and also voice coil motors 71 and 72 were used for it, having used it as the actuator which carries out the load of the external force to the operation shaft 14, gear mechanism becomes unnecessary and it can attain a miniaturization and low-cost-izing of equipment Moreover, since having used voice coil motors 71 and 72 and gear mechanism are unnecessary, and control of vibration which carries out a load to the operation shaft 14 becomes easy and can give a predetermined feeling of resistance clearly by the operator, while being able to prevent beforehand the false drop of a mounted electrical machinery and apparatus, and the error of functional adjustment, it becomes easy to perform fine tuning of the function of a mounted electrical machinery and apparatus.

[0074] Next, the example of the 3rd operation gestalt of the input unit for mount concerning this invention is explained using drawing 19 or drawing 21. The input unit for mount of this example used the voice coil motor for mechanism section 11B as an actuator for acting external force on the operation shaft 14, And the plan of mechanism section 11B which drawing 19 requires for this example in the operation shaft 14 by being characterized by the specific thing it enabled it to rock only to ** on the other hand, the direction side elevation of X of mechanism section 11B which drawing 20 requires for this example, and drawing 21 are the direction side elevations of Y in which mechanism section 11B concerning this example carried out the cross section the part.

[0075] So that clearly from these drawings mechanism section 11B of this example The base 12, the spherical bearing 13 prepared in the base 12 concerned, and the operation shaft 14 with which spherical section 14a was prepared in the soffit section, and the spherical section 14a concerned was supported to revolve by the aforementioned spherical bearing 13 free [rocking], One voice coil motor 71 arranged on the axis centering on the aforementioned spherical bearing 13, the link which fixed to moving-part 71a of the voice coil motor 71 concerned -- with a member 81 the link concerned -- it consists of a connection pin 82 which enables pin combination of the rotation of a member 81 and the aforementioned operation shaft 14, and one position sensor 76 which detects the amount of rocking and the rocking direction of the aforementioned operation shaft 14, and the manual scanning section 3 is attached in the upper-limit section of the aforementioned operation shaft 14

[0076] the aforementioned voice coil motor 71 -- the aforementioned link -- moving-part 71a in which the member 81 was attached, and the moving-part 71a concerned consist of fixed part 71b constituted possible [in-and-out], and pin combination of the revolution of the back end section of fixed part 71b to the bracket 79 prepared in the base 12 is enabled The voice coil motor 71 of this example is also for giving a feeling of resistance to operation of the manual operation section 3, for example, it is applied to the adjustment of operating speed according to regulation of the operation direction of the manual operation section 3, and the control input of the manual operation section 3, arrest-point regulation of the manual operation section 3, etc. moreover, the aforementioned position sensor 76 consists of needle 76b by which insertion arrangement was carried out into main part of detector 76a, and the main part of detector 76a concerned -- having -- **** -- needle 76b -- an end -- the aforementioned link -- it is attached in the member 81

[0077] About other composition, since it is the same as the input unit for mount concerning the example of the 2nd operation form, in order to avoid duplication, explanation is omitted. It has the same effect as the input unit for mount which the input unit for mount of this example of an operation form also requires for the example of the 2nd operation form.

[0078] Hereafter, the example of the 4th operation form of the input unit for mount concerning this invention is explained using drawing 22 or drawing 24. The input unit for mount of this example equipped mechanism section 11C with the voice coil motor as an actuator for acting external force on the operation shaft 14, And the plan of mechanism section 11C which drawing 22 requires for this example by being characterized by constituting so that the parallel displacement of the operation shaft 14 may be carried out to the base 12, the direction side elevation of X in which mechanism section 11C which drawing 23 requires for this example carried out the cross section the part, and drawing 24 are the direction side elevations of Y of mechanism section 11C concerning this example.

[0079] So that clearly from these drawings mechanism section 11C of this example The base 12 and X-Y stage 91 prepared in the base 12 concerned, The operation shaft 14 which fixed to X-Y stage 91 concerned, and the floating joint 92 of the 2-way with which the operation shaft 14 concerned was equipped, Two voice coil motors 71 and 72 arranged on the axis which intersects perpendicularly in a field parallel to the base 12 centering on the center valve position of the aforementioned operation shaft 14, Two sliders 93 and 94 which fixed to the moving part 71a and 72a of the voice coil motors 71 and 72 concerned, and were connected with the aforementioned floating joint 92 free [sliding], It consists of two position sensors 76 and 77 which detect the movement magnitude and the move direction of the aforementioned operation shaft 14, and the manual scanning section 3 is attached in the upper-limit section of the aforementioned operation shaft 14.

[0080] Direction rail of X 91a by which aforementioned X-Y stage 91 has been arranged towards the direction of X of the base 12, Direction slider of X 91b with which the direction rail of X 91a concerned was equipped free [sliding], Direction rail of Y 91c which has been arranged towards the direction of Y of the base 12, and was formed in the aforementioned direction slider of X 91b, and one, It consists of direction slider of Y 91d with which the direction rail of Y 91c concerned was equipped free [sliding], and the operation shaft 14 is being perpendicularly fixed to the aforementioned direction slider of Y 91d upper surface. Therefore, the parallel displacement of the operation shaft 14 can be freely carried out within the limits of [movable] X-Y stage 91 in a field parallel to the base 12.

[0081] The floating joint 92 forms the concaves 95 and 96 of two articles which can slide on the sliders 93 and 94 which fixed to the moving part 71a and 72a of a voice coil motor in two sides which intersect perpendicularly, and is attached at a level with the operation shaft 14. A slider 93 is set up in a concave 95 so that it may slide only in the direction of Y to a concave 95, and a slider 94 is set up in a concave 96 so that it may slide only in the direction of X to a concave 96. the aforementioned voice coil motors 71 and 72 -- the aforementioned link -- it consists of moving part 71a and 72a in which the member 81 was attached, and fixed parts 71b and 72b which the moving part 71a and 72a concerned consisted of possible [in-and-out], and is fixed to the bracket 79 with which the back end section of fixed parts 71b and 72b was prepared in the base 12.

[0082] Therefore, when the operation shaft 14 is in every position on X-Y stage 91, the load of the external force of the direction of Y can be carried out to the operation shaft 14 through a slider 94 and the floating joint 92 by driving a voice coil motor 71 by being able to carry out the load of the external force of the direction of X to the operation shaft 14 through a slider 93 and the floating joint 92, and driving a voice coil motor 72. Of course, the load of the external force of the direction according to the output of each voice coil motors 71 and 72 and a size can be carried out to the operation shaft 14 by driving voice coil motors 71 and 72 simultaneously. Thereby, a feeling of resistance can be given to operation of the manual operation section 3, for example; adjustment of operating speed according to regulation of the operation direction of the manual operation section 3 and the control input of the manual operation section 3, arrest-point regulation of the manual operation section 3, etc. can be performed.

[0083] Position sensors 76 and 77 consist of needles 76b and 77b by which insertion arrangement was carried out in the main parts 76a and 77a of a detector, the main part of detector 76a concerned, and 77a, and Needles 76b and 77b are formed in the floating joint 92 and one.

[0084] About other composition, since it is the same as the input unit for mount concerning the example of the 2nd operation form, in order to avoid duplication, explanation is omitted. It has the same effect as the input unit for mount which the input unit for mount of this example of an operation form also requires for the example of the 2nd operation form.

[0085] Hereafter, the example of the 5th operation form of the input unit for mount concerning this invention is explained using drawing 25 or drawing 27. The input unit for mount of this example equipped mechanism section 11D with the voice coil motor as an actuator for acting external force on the operation shaft 14, It is what is characterized for having constituted so that the parallel displacement of the operation shaft 14 might be carried out to the base 12, and the operation shaft 14 by the specific thing it enabled it to rock only to ** on the other hand. The plan of mechanism section 11D which drawing 25 requires for this example, the direction side elevation of X of mechanism section 11D which drawing 26 requires for this example, and drawing 27 are the direction side elevations of Y in which mechanism section 11D concerning this example carried out the cross section the part.

[0086] So that clearly from these drawings mechanism section 11D of this example Direction slider of X 91b with which direction rail of X 91a prepared in the base 12 and the base 12 concerned and the direction rail of X 91a concerned were equipped free [sliding], One voice coil motor 71 arranged on the axis of the aforementioned direction rail of X 91a, the link which fixed to moving-part 71a of the voice coil motor 71 concerned -- with a member 81 the link concerned -- it consists of a connection pin 82 which enables pin combination of the rotation of a member 81 and the aforementioned operation shaft 14, and one position

sensor 76 which detects the amount of rocking and the rocking direction of the aforementioned operation shaft 14, and the manual scanning section 3 is attached in the upper-limit section of the aforementioned operation shaft 14

[0087] the aforementioned voice coil motor 71 -- the aforementioned link -- moving-part 71a in which the member 81 was attached, and the moving-part 71a concerned consist of fixed part 71b constituted possible [in-and-out], and the back end section of fixed part 71b is being fixed to the bracket 79 prepared in the base 12 The voice coil motor 71 of this example is also for giving a feeling of resistance to operation of the manual operation section 3, for example, it is applied to the adjustment of operating speed according to regulation of the operation direction of the manual operation section 3, and the control input of the manual operation section 3, arrest-point regulation of the manual operation section 3, etc. Moreover, the aforementioned position sensor 76 consists of needle 76b by which insertion arrangement was carried out in main part of detector 76a, and the main part of detector 76a concerned, and needle 76b is attached in the operation shaft 14.

[0088] About other composition, since it is the same as the input unit for mount concerning the example of the 3rd operation form, in order to avoid duplication, explanation is omitted. It has the same effect as the input unit for mount which the input unit for mount of this example of an operation form also requires for the example of the 3rd operation form.

[0089]

[Effect of the Invention] Since the input unit for mount of this invention was made to carry out the load of the external force beforehand set as the operation shaft according to the control input of the manual operation section from an actuator when the manual operation section was operated within movable limits which were able to be defined beforehand, by sensing the external force by which a load is carried out from an actuator, an operator can know the control input of the manual operation section sensuously, and delicate operation of the manual operation section is attained. Therefore, the manual operation section is only operated to a movable limitation, it comes to be able to do usage of performing functional adjustment of the mounted electrical machinery and apparatus chosen not only the usage of choosing a desired mounted electrical machinery and apparatus but by adjusting the control input of the manual operation section, and the operability of the manual operation section, as a result the input unit for mount can be raised. Moreover, since it is the composition which carries out the load of the external force of the predetermined intensity from an actuator to an operation shaft, an operation shaft or bearing is not damaged.

[0090] Since the input unit for mount of this invention was made to carry out the load of the external force beforehand set as the operation shaft according to the operation direction and control input of the manual operation section from an actuator when the manual operation section was operated in the direction of [other than the movable range which was able to be defined beforehand] An operator can know the correction of the operation direction of the manual operation section sensuously, and since it becomes possible to operate the manual operation section only within movable limits, the operability of the manual operation section is improved.

[0091] Since the input unit for mount of this invention held the operation shaft free [rocking] to bearing, it can simplify the composition of an operation shaft attaching part, and can carry it out cheaply.

[0092] Since the input unit for mount of this invention fixes an operation shaft to a slider and is slid on a rail top, it can operate an operation shaft within a fixed flat surface along with a rail, and can make operability of an operation shaft good.

[0093] Since the input unit for mount of this invention was made to carry out both-way operation of the manual operation section only in the one specific direction, on the other hand, it can perform the manual operation section for selection of a desired mounted electrical machinery and apparatus, the selected functional adjustment of a mounted electrical machinery and apparatus, etc. only to ** by [specific] carrying out both-way operation, and can carry out the operability of the manual operation section to a good thing.

[0094] The kind of function which can be adjusted can also increase it while it can operate the manual operation section in the arbitrary directions in a specific field and can increase the number of the mounted electrical machinery and apparatus in which selection adjustment is possible, since the input unit for mount of this invention enabled it to operate the manual operation section in the arbitrary directions in a specific field.

[0095] Since the voice coil motor was used for it, having used the input unit for mount of this invention as the actuator which carries out the load of the external force to the manual operation section, the mechanism for changing rotation of a motor into a both-way rectilinear motion becomes unnecessary, and it can attain a miniaturization and low-cost-izing of the input unit for mount.

[0096] Since the input unit for mount of this invention carries out the load of the vibration of the mode which carries out the load of the big external force one by one to an operation shaft from an actuator, or is different as the control input of the manual operation section becomes large, it can realize the control input of the manual operation section by blind touch, and can make operability of the input unit for mount better.

[0097] Since the input unit for mount of this invention carries out the load of the external force more shocking than an actuator on an operation shaft when operated to the operation limitation that the manual operation section was defined beforehand, it can realize by blind touch that the control input of the manual operation section reached to the critical point, and can make operability of the input unit for mount better.

[0098] The classification of the mounted electrical machinery and apparatus chosen by the input unit for mount of this invention connecting a position sensor with the display with which the automobile was equipped through the computer with which the automobile was equipped electrically, and operating the manual operation section, Since the content of the function of the mounted electrical machinery and apparatus concerned adjusted by operating the manual operation section and the activity of

the manual operation section are displayed on display While a passenger checks the content of a display of display, functional adjustment of a mounted electrical machinery and apparatus can be performed, and functional adjustment of the electrical machinery and apparatus concerned can be ensured [quickly and].

[0099] Since the input unit for mount of this invention operates the sheet adjusting device for controlling the posture of a driver's seat or a passenger seat in the manual operation section, it can perform necessary operation by the hand using the manual operation section, and can carry out [easy]-izing of the posture adjustment of a driver's seat sheet or a passenger seat sheet.

[0100] Since the input unit for mount of this invention operates the tilt equipment and TERESUKO equipment with which the steering system for adjusting the height of a handle was equipped in the manual operation section, it can perform necessary operation by the hand using the manual operation section, and can carry out [easy]-izing of the height adjustment of a handle.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the perspective diagram showing the installation state to the dashboard of the input unit for mount concerning the example of the 1st operation gestalt.

[Drawing 2] It is the plan showing the indoor state of an automobile where the input unit for mount concerning the example of the 1st operation form was attached.

[Drawing 3] It is the perspective diagram of the mechanism section equipped with the manual operation section concerning the example of the 1st operation form, and the manual operation section concerned.

[Drawing 4] It is the important section cross section seen from [where it has the manual operation section concerning the example of the 1st operation form, and the manual operation section concerned / of the mechanism section] the side.

[Drawing 5] It is the plan of the mechanism section concerning the example of the 1st operation form.

[Drawing 6] It is the plan of the manual operation section concerning the example of the 1st operation form which removed covering.

[Drawing 7] It is explanatory drawing which illustrates the operation direction of the manual operation section concerning the example of the 1st operation form, and the classification of the mounted electrical machinery and apparatus chosen by it.

[Drawing 8] It is explanatory drawing which illustrates the operation direction of the manual operation section concerning the example of the 1st operation form, and the classification of the function switched by it.

[Drawing 9] It is the block diagram showing the control system of the electric motor concerning the example of the 1st operation form.

[Drawing 10] It is front drawing showing an example of the data table memorized by the memory with which the computer concerning the example of the 1st operation form was equipped.

[Drawing 11] It is the flow chart which shows the control procedure of the electric motor concerning the example of the 1st operation form.

[Drawing 12] it saw from [which shows the attachment mechanism of the input unit for mount concerning the example of the 1st operation form over a dashboard] the flat surface -- it is a fracture view in part

[Drawing 13] it saw from [which shows the attachment mechanism of the input unit for mount concerning the example of the 1st operation form over a dashboard] the side -- it is a fracture view in part

[Drawing 14] It is explanatory drawing which illustrates the menu of the mounted electrical machinery and apparatus displayed on the display concerning the example of the 1st operation form.

[Drawing 15] It is explanatory drawing which illustrates the state of the mounted electrical machinery and apparatus under functional adjustment displayed on the display concerning the example of the 1st operation form.

[Drawing 16] It is the plan of the mechanism section with which the input unit for mount of the example of the 2nd operation form is equipped.

[Drawing 17] It is the direction side elevation of X of the mechanism section with which the input unit for mount of the example of the 2nd operation form is equipped.

[Drawing 18] It is the direction side elevation of Y of the mechanism section with which the input unit for mount of the example of the 2nd operation form is equipped.

[Drawing 19] It is the plan of the mechanism section with which the input unit for mount of the example of the 3rd operation form is equipped.

[Drawing 20] It is the direction side elevation of X of the mechanism section with which the input unit for mount of the example of the 3rd operation form is equipped.

[Drawing 21] It is the direction side elevation of Y of the mechanism section with which the input unit for mount of the example of the 3rd operation form is equipped.

[Drawing 22] It is the plan of the mechanism section with which the input unit for mount of the example of the 4th operation form is equipped.

[Drawing 23] It is the direction side elevation of X of the mechanism section with which the input unit for mount of the example of the 4th operation form is equipped.

[Drawing 24] It is the direction side elevation of Y of the mechanism section with which the input unit for mount of the example of the 4th operation form is equipped.

[Drawing 25] It is the plan of the mechanism section with which the input unit for mount of the example of the 5th operation form is equipped.

[Drawing 26] It is the direction side elevation of X of the mechanism section with which the input unit for mount of the example of the 5th operation form is equipped.

[Drawing 27] It is the direction side elevation of Y of the mechanism section with which the input unit for mount of the example of the 5th operation form is equipped.

[Drawing 28] It is the inside view of the automobile in which the example of installation of the input unit for mount concerning the former is shown.

[Drawing 29] It is the side elevation of the input unit for mount by which the conventional proposal is made.

[Drawing 30] It is the plan of the manual operation section of the input unit for mount shown in drawing 29 .

[Drawing 31] It is the plan of the guide plate included in the input unit for mount shown in drawing 29 .

[Description of Notations]

1 Input Unit for Mount.

2 Case

3 Manual Operation Section

4a, 4b, 4c, 4d, 4e, 4f Push button switch

5a, 5b, 5c Push button switch

6 Volume Tongue

7 Card Slot

8 Disk Slot

11 Mechanism Section

14 Operation Shaft

15 Solenoid (Driving Means)

19a, 19b Electric motor (actuator)

21a, 21b Encoder (position sensor)

33 Photo Interrupter (Detection Sensor of Finger)

41 CPU

42 Collating Section

43 Table Selection Section

44 ROM

45a, 45b, and 45c ... Table

46 Position Signal Detecting Element

71 72 Voice coil motor (actuator)